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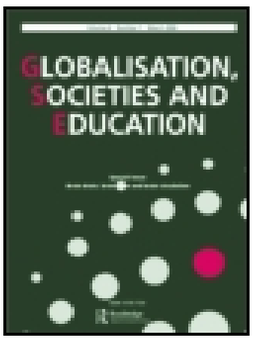

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The OECD as an arena for debate on the future uses of computers in schools

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ABSTRACT

Computer education was an integral part of curriculum development and a priority of the OECD's policy agenda at the turn of the 1970s. Based on an analysis of archival documents, programme overviews and publications, this article describes how the introduction of computers in the classroom was advocated by the OECD and, more specifically, how this fostered the creation of an arena for the production of knowledge. The article sheds light on the OECD as an arena for the pooling and channelling of ideas relating to the uses of school computers. It, therefore, not only fills a gap in the history of educational technology, but also demonstrates how knowledge was catalysed and disseminated by this international governmental organisation. Furthermore, the study analyses an attempt to intervene in national policy-making that was withdrawn before it was implemented.

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Introduction

At the turn of the 1970s, computers were promoted and popularised as educational media, and this coincided with a change in technology. Terminal systems provided access via a telephone line, even from remote locations. The new generation of computers was no longer operated by punched cards but by alphanumeric keyboards, and system integration had made processing faster. TV screens for displaying data and text were added, and the improvement in computing time allowed for the depiction of graphics, such as turtles on the screen. These animals would soon be moved, using the programming language LOGO, which, like BASIC, had been invented to make it easier for non-mathematicians to interact with the computer. As a result, a larger percentage of the student population could be reached who were inclined to use a computer. In addition, the concept of time-sharing had transformed the computer into a new, potential learning tool, as time-sharing meant that numerous students could operate at the same time, making computers a new mass medium that fittingly served the accelerated demand for education (Dear 2017; Ferster 2014; Hof 2021; Papert 1980; Rankin 2018).

This article analyses the connection between technology and educational expansion and reform. Given the accelerated transition to mass education in many OECD member states around 1970 and plans to give more children without academic background not only the opportunity to study, but also access to information technology, computers were seen as a beneficial new media for secondary and higher education (Capel 1991). Despite the fact that debates emerged around 1970 as to whether the new technological conditions made computers a suitable means of coping with the increasing number of students and significant demand for education, the early history of computer

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education has hardly been investigated. Not only were computers seen as a beneficial means of solving problems associated with mass schooling, but also as agents bringing about change and modernisation. This vision of the unconditioned relevance of computers for the school-of-tomorrow attracted the attention of the OECD. In its first programme, launched in 1968, the OECD's Centre for Educational Research and Innovation (CERI) defined educational technology as one of four core areas of study, and set up a working group on this subject (CERI 1971a, 9).[1] This article seeks to understand the reasons for the advocacy of computer education around 1970 and, in particular, how the CERI promoted and researched the introduction of digital devices in the classroom. In so doing, the article carves out an important but neglected rationale, namely educational growth as a central argument legitimising the use of computers. The article also examines why the CERI's interest waned following a period of intensive, coordinated exchanges between numerous invited experts. This was tantamount to the disbanding of the working group on computer technology (CT) after seven years of activity.

The CERI is to be considered as an international platform where ideas come together. Therefore, we use the CERI as a 'vantage point' (Schmelzer 2016, 73) to examine different arguments that were put forward to underpin the benefits of computers. Drawing on the documents of the working group on CT, the minutes of the CERI's governing board, programme overviews and publications sourced from the OECD archives, we argue that the CERI's engagement with computers in schools, was a continuation of the OECD's earlier, educational agenda. Technologies to improve the process of learning, such as the use of radio, television or computers, were framed by two important discourses, underlying the OECD's commitment to education, namely the vision of progress towards a universal technological world and the idea of economic growth by investing in human capital (Bürgi 2016; Schmelzer 2016).

This article combines three theoretical perspectives in order to capture the definition of a *moderated arena*. Firstly, international organisations can be understood as 'central nodes for policy diffusion' (Jakobi 2012) since they channel policies, transfer them across country borders and support the borrowing of policies by establishing and promoting so-called best practices. However, we pay attention to the emergence of these 'nodes', rather than the possible impact of policies. This article relates to the structures implemented for the exchange and diffusion of knowledge – particularly visible in meetings, workshops and conferences – and we interpret these structures as arenas. Secondly, by drawing on a history of knowledge approach, we interpret arenas as 'places or platforms offering the opportunity and setting the limits for certain forms of circulation of knowledge' (Östling 2020, 122). As this definition does not estimate that arenas can be hierarchically structured with predefined roles, norms and specific rules we, thirdly, complement this view with the theory put forward by Centeno (in this volume; see also Centeno 2017), namely, that arenas can be instrumentalised by actors who transform them into places for the promotion of their own interests. Considering these three perspectives together, we regard arenas as being dependent upon and defined by internal dynamics, varying influences and structural settings. The arena offered by the CERI was neither 'neutral', nor did it foster the exchange between experts and the lay public. Apart from offering an arena for debate on the use of computers in schools, the CERI needs to be seen as an actor in its own right as it, for instance, disseminated specific epistemologies within its member states and beyond, without an official mandate for education (Bürgi 2017a, 2017b; Centeno 2017; Ydesen 2019). In order to grasp both dimensions – arena and actor – we approach the CERI's working group on CT as a *moderated arena* that brought together stakeholders and experts from various OECD member countries. Previously set agendas determined the topics addressed and time was a major limiting factor in all discussions. The invited experts thus strove for attention in order to reach their own goals. The article shows that participants were selected and guided by the minutes prepared by the CERI's secretariat, and discussions were channelled and moderated by the CERI's staff.

Computer education is the empirical case, used here to address conceptual questions on the complexity of multi-layered governing. The aim is to contribute to a better understanding of the process of knowledge production and channelling within the OECD, and its strategies for

policy-making through an analysis of the activities in the moderated arena and the ideas developed and promoted in this context. The argument is developed in four stages: firstly, we demonstrate how the CERI got involved in computer education and how this agenda was advocated. Secondly, we outline how this research centre provided a moderated arena for debates, and thirdly, we depict the reasons why the working group on CT discontinued its activities in 1975. In the fourth section, we will elaborate on the consequences of these activities on policy formation.

Core subject in the first programme of the CERI

Shortly after the establishment of the CERI in 1968, a working group on computer technology (CT) was set up and computers featured prominently in the CERI's first agenda, as activity 4, 'curriculum development and educational technology' (CERI 1971a, 14). According to a document circulating within the research centre's governing board, this step was taken as 'many European member countries' were concerned with institutionalising educational technology in 'the general context of reforms and innovations' (CERI/GB(69)23, 25). A glance across the Atlantic, in particular, at the Sloan Foundation, shows that this American private sponsor likewise decided to support a programme to investigate the potential of educational technology, aimed at giving more students access to computers (RAC/WWP, R1970 and R1971).

Around 1970, computers became more user-friendly and were consequently considered as a possible new media and learning tool for public schools. The CERI's commitment to educational technology formed part of a general trend. However, as will be argued in the following, its engagement in this area has a longer history, that began within the framework of the OECD's predecessor, the OEEC. The CERI's new activity was shaped by the discourses underlying these organisations' commitment to education, namely education for the technological world-of-tomorrow and for the enhancement of human capital, in order to stimulate economic growth (Bürgi 2016). Furthermore, as the challenges of educational expansion – fostered by human capital thinking – became strikingly visible, the use of technologies was promoted to solve, and as such to redeem the discourse which fostered expansion.

The continuity from the OEEC/OECD's engagement with educational technology to the CERI's activities in this area becomes particularly visible in relation to the actors who advocated their inclusion in the CERI's programme, such as the Committee for Scientific and Technical Personnel (CSTP). This committee, mainly staffed by scientists, was established in 1958 in the wake of the so-called Sputnik shock, in order to address the supposed backlog in technological development vis-à-vis the Soviet Union. The CSTP followed an international trend after the launch of the Soviets' satellites Sputnik I and II, which triggered the development of educational technology in both the East and the West (Hof 2018). Since it was believed that more knowledge of mathematics and better science education would foster technological innovation, the new committee began considering educational policies – even though the OEEC did not have a mandate for education (Bürgi 2017a). The CSTP's chairman, the British chemist Alexander King, stated in the first meeting that many young people were discouraged to follow a technical career path 'owing to the unattractive way in which they were taught mathematics from the age of 7 or 8' (STP/GC/M/58(1), 14). The committee was convinced that teaching and learning aids, in other words educational technologies *avant la lettre* like radio, films and so-called teaching machines, could render science and maths education more interesting. Therefore, the committee organised courses promoting the use of these learning devices and media. Furthermore, the OEEC (subsequently the OECD) hosted a 'cinematheque' containing a large collection of visual teaching aids (Bürgi 2019; OECD 1966, 70). The search for adequate educational technology was part of the committee's curriculum development programme which became – alongside the collection and comparison of data regarding scientific and technical personnel – one of its main foci. In 1961, when the OEEC was transformed into the newly transatlantic organisation, the OECD, the CSTP as well as its programmes on curriculum development and teaching aids continued (Bürgi 2017a, 70).

Priorities changed in 1964, when the OECD's secretariat initiated a review of the organisation's operational programmes. Complaints were made that the organisation had grown into an uncontrolled 'mammoth' and was reaching its limits in terms of personnel and finances. As a result, it was argued that the OECD's programme should be more closely tied to economic objectives (Bürgi 2016). In the wake of these cutbacks, curriculum development, including the use of films and radio in schools, ceased for the benefit of educational planning, to ensure meaningful data processing and to compare the enhancement of human capital. These topics had become the main concerns of the CSTP, owing to the OECD's economic growth agenda (Elfert 2019; Schmelzer 2016; Tröhler 2013).

The representatives of the CSTP regretted the decision of the OECD council to cease these programmes and conducted a review of the committee's curriculum development activities. The result was published in 1966 under the title, *Curriculum Improvement and Educational Development: Modernizing our Schools*. Although the publication had been initiated as a review, it became a manifesto of the CSTP's engagement with curriculum development, as well as its intertwined subjects: teaching and learning aids. As such, the publication aptly illustrates the discourses framing the organisation's commitment to educational technologies. In the introduction, the review indicated the OECD's assumption that industrialised countries were increasingly developing as societies governed by the primacy of technology. Thus, any future curricula should serve to prepare students for their role 'in the [technological] world of tomorrow' (OECD 1966, 32). The idea of a universalistic, technological culture became the perfect connecting point to legitimize the promotion of educational technology, in particular the computer, with its attributed meaning to embody technological and societal progress. The authors of *Curriculum Improvement and Educational Development* argued that activities on 'learning aids are particularly rewarding' (ibid., 70) and are a key aspect of curriculum development (ibid., 68). Furthermore, they legitimised these aids in different contexts as a key task to deal with on an international level. For instance, they highlighted the universality of educational technology: 'Many learning aids are of an "international" character and of universal application, subject to adaptation to specific national conditions. The obvious example is teaching machines and science teaching apparatus, which most of the countries purchase from abroad' (ibid.). In addition, by considering the OECD's focus on growth and human capital, the review pointed to economic rewards, resulting from using education technology. Accordingly, it argued that school television and programmed instruction would free teachers from 'trivial training' (ibid., 69) and would enhance the 'effectiveness of learning' while 'keeping up the pupils' motivation and interest in education' (ibid.).

The study's arguments were strengthened with the foreword of the OECD's deputy secretary general, who argued that a committee dealing with education had to regard the quantitative aspects (educational planning) and the qualitative aspects (curriculum development and teaching) as being intertwined: 'the "quantitative" and "qualitative" aspects of educational planning cannot be divorced from each other' (Harris in: Bürgi 2017a; OECD 1966, 5). The CSTP's initiative to secure the OECD's broad focus on education was supported and echoed by a network of sociologists, which had used the organisation since its inception as an arena for pooling their ideas relating to equality and educational opportunity. Against the background of a looming international educational crisis, caused by the increasing demand for education, their common efforts led to the founding of the CERI (Bürgi 2016, 2017b). The focus on qualitative aspects and the consideration of the micro cosmos of schooling, is prominent in the outline of the CERI's first programme: 'The school is to the educational system what the firm is to the economic system. Effectiveness must be sought not only in terms of national planning and strategies, but also in the school itself' (CERI 1971a, 14). By highlighting the micro level of schooling, this helped improve legitimate activities relating to curriculum development and educational technology.

However, these topics only became part of the CERI's core programme, due to an intervention of the committee that usually dealt with educational technology: the CSTP. In 1967, shortly before the research centre was established, certain committee representatives stressed that curriculum

development was missing from the preliminary programme (STP/M(67)1–3). They reiterated the arguments stated in the aforementioned study, highlighted the OECD's neutrality (STP/M(67)1, 4) and declared that 'at this stage the Committee decided to make a firm recommendation that the CERI should actively take up the work in curriculum reform, which had been suspended in the Committee's programme' (STP/M(67)3, 7). Therefore, the CERI's reasoning to deal with technologies, mirrors the rationale that the CSTP used to legitimize the research centre's activities on the development and use of learning aids – the provision of human capital for the future, technological world. The computer was given the role of preparing *all* learners in an *individualized way* for the labour market, as it was believed that computers would become more and more involved in day-to-day life and, in particular, in economic activities: A 'successful computerisation of commerce and industry' was seen as 'essential for the future economy of Europe', thus it was expected that 'many present pupils will have jobs in which they have to work with computers' (CERI/CT/70.01, 3; CERI/CT/70.08). Based on the assumption that human capital needed to fit the labour market, education had to adapt to this economic development. It was not deemed essential that everyone should become an expert, however, it was argued that all students must learn how the computer works as well as how to write a programme, as general knowledge could outlast technological changes (CERI/CT/73.3). Computer education was meant to prepare students for the technologized society and their future workplace. In line with this position, 'computer science should not be a separate subject, and many teachers should use it' (CERI/CT/70.08, 305).

These arguments correspond with four rationales, discussed in previous research literature: while the social rationale includes arguments that technologies – be it the radio, the television, the teaching machine or the computer – prepare students for life in an evolving modern world, a vocational rationale is established when it is claimed that technologies are learning tools that prepare students for the labour market. Arguments relating to personalised learning and playful teaching with computers, refer to the pedagogical rationale. The fourth rationale is the most hidden, but has the strongest effect: the transformational rationale or the vision that technologies enable change and thus constitute the means for modernisation (Cuban 2001, 12–15; Good 2019; Hawkridge 1990). Considered together, these rationales are generally used in the marketing of new tools and in the implementation of school reforms. Within the CERI's arena, however, these four rationales were complemented by a fifth, which is missing in the research literature, namely educational growth. While human capital theory, in particular, functioned as an enhancer of growth, in the context of the CERI, educational technology was framed as a remedy for the effects of the tremendous expansion of the educational systems, as it allowed the masses to be educated. Accordingly, the CERI's first programme stated that 'curriculum development and educational technology' are part of the centre's activities because of 'the need to ensure that the quantitative growth of the school system is accompanied by qualitative development in the form of new curricula, teaching methods and educational technologies' (CERI 1971a, 9). Indeed, George Papadopoulos, a long-term OECD staff member, responsible for curriculum development, mentioned in retrospect that educational technology was promoted as a strategy to meet the challenges of educational expansion, such as overcrowded classrooms, constituting developments that became clearly visible in the late-1960s (Papadopoulos 1990, 35). In this context, educational technology was reinterpreted as a remedy, rather than an amplifier of expansion.

A moderated arena for policy-making

Firstly, educational technology was put on the CERI's agenda as a core area of activity, then, with the creation of the working group on CT, the research centre became a moderated arena to analyse new trends, develop knowledge and formulate appropriate recommendations for new policy. The term arena is appropriate, as the participants changed according to the topic and the fluctuation in numbers was high. There is no pattern of constant participants apart from the moderator and the CERI, and this moderator built up its role and influence over the course of the debates. These were

led by staff of the CERI, who were responsible for formulating the minutes and also signing the protocols. By bringing together international experts, the CERI's secretariat channelled knowledge by adopting a specific epistemological position, namely, to define classroom computer use as an integral part of a system and to understand educational technology as a means of promoting conceptual thinking.

The CERI's role as a coordinator is visible in the fact that the creation of policy was perceived as a bottom-up process: the position was taken that innovations should result from pilot experiments in schools, from which proposals for 'general action' and curriculum reform could be deduced (CERI/CT/69.03). In 1969, the members of the CERI's general board noted that the increasing number of computers would have consequences for education. To assist in its activity relating to educational technology and curriculum development, the research centre recruited the German psychologist, Klaus Hinst, who in 1970, following his time at the CERI, became the first director of the Bildungstechnologisches Zentrum (BTZ) founded in Wiesbaden (Wirtschaftswoche 1974). Hinst took the view that the increasing number of computers made it necessary to consider the reorganisation of the 'educational process', and that the CERI was the appropriate place to develop respective measures (CERI/GB/M(69)3, 10). The research centre described its own role as a 'catalyst in the field of curriculum development', offering workshop participants the opportunity to share their views. With regard to the computer, the CERI sought to encourage the implementation of 'innovation', and the study of the kind of curricula that would be needed in order to do so (CERI/GB (69)2, 10).

As previously mentioned, computer education captured the CERI's interest from the outset and was chosen as a core area of research in 1968. Debates on possible computer uses started from the observation that their recent introduction in the classroom had been too random and limited to mathematics. Consequently, the governing board proposed a first seminar to discuss the state of the art and to compare national experiments carried out so far (CERI/GB(68)16). In a first step, the position was taken that the engagement should not be too ambitious, since 'numerous activities were developing at national levels'. Proposals in the draft programme remained restricted to surveys and pilot experiments (CERI/GB/M(68)1; CERI/GB/M(68)2). At the third meeting, however, the CERI's board members agreed to support two cooperative research programmes: one was meant to investigate school computer uses in general, the other focused on computers in secondary and higher education. It was thought that the CERI should help 'explore the possibility of promoting a general policy for the use of computers in education' (CERI/GB/M(68)3, 6). The protocols from the CT working group confirm that this committee served mainly as an arena for the pooling of information regarding projects launched in OECD member states. As computer education was a new field of enquiry, discussions organised by the CT working group concentrated on the uses of computers in the teaching of geography, physics, mathematics, biology or languages. Again, this working group understood itself as a 'catalyst' that would propose activities which would be carried out through international co-operation (CERI/CD/M(71)1, 6). The group intended to produce 'a series of recommendations to guide the national authorities in preparing their decisions' (CERI/CT/71.01, 7). The overall aim of the studies made was to develop scientific and methodological approaches to education in line with that perceived as the qualitative, procedural and content aspects of learning at micro level; more specifically, the activities in the classroom (CERI/GB (69) 23).

A joint international research project on the use of computers in higher education initiated a series of studies, financed and coordinated by the CERI. The focus was later expanded to include secondary education, as it was argued that every pupil must learn how to use a computer in order to be prepared for future learning. Hence, several meetings concentrated on the basics of computer programming languages, like BASIC, as well as on the reform of teacher training. Both these topics became the main areas of discussion (CERI/CT/69.06, CERI/CT/69.08, CERI/CT/70.15). It was perceived that the number of projects and experiments were increasing in the OECD member countries to the point 'where there is no country which is not at present studying

ways and means of making wider use of this teaching instrument' (CERI/GB(69)1). The CERI departed from trend analysis (CERI/GB(69)3) and now aimed to promote the establishment of an 'international plan on the basis of cooperation', as it was believed that education would soon be unthinkable without the use of computers (CERI/GB(69)10). These were not only considered as a solution to meet educational growth but were also perceived as agents of change and a means of improving pedagogy.

The discourse on progress stimulated debates that implicitly anticipated the need for computers. Without detailed explanation, their use was understood as 'innovative activities in the schools of member countries' (CERI 1971a, 15). Changes in technology and changes in how technology was understood should stimulate changes in education, which would in turn require adequate planning (CERI/CD/M(72)2, 11). Technology seemed to be a suitable means of meeting the challenges that had emerged from the increasing number of students enrolled in education. The position was taken that, although computer science courses for specialists would always be required, it was the non-specialists that needed to familiarise themselves with computers. The machine was a 'black box ready to act out an enormous variety of functions or structural roles' (CERI/CT/70.05). The computer was perceived as a tool no longer limited to calculations, management and research, but as a possible teaching and problem-solving device for simulations, drills, practices and in tests (CERI/CT/68.02; CERI/CT/68.03).

Technological change was seen as a determinant variable of social transformation, ultimately requiring a reform of the educational system. Hence, the working group organised several seminars with the goal of defining a general policy for change. Teachers played a key role as the target group, addressed through this intended technology-based reform. More precisely, it was argued that teachers had to accept the new policy in order to successfully introduce the computer into the classroom (CERI/GB/M(68)3, 11). Here the top-down feature of the moderated arena becomes more apparent: teachers were conceived as the recipients of reform ideas which they had to implement. Accordingly, teachers' training was deemed important in bringing about change (Tinsley 1972a, 1972b). Training was the strategy to transfer knowledge from the arena into the outside world. Yet although courses were made available to teachers, they were never fully subscribed and even by 'acquiring a computer and offering computer time at schools, very few replied and some of the computer time remained unused' (CERI/CT/70.01, 6.f). Around 1970, teachers were not familiar with computers, but the intention was to promote their uses in school on a broader basis. Teachers were seen as key protagonists of this educational reform.

A significant number of conferences, workshops and formal meetings were organised in the three years after 1969, and the experiments developed in the OECD member countries, among them Denmark, France, Germany, Japan, UK and Spain, were intensive. Many researchers travelled to CERI meetings organised under the umbrella of CT. The invited experts in pedagogy and psychology helped channel knowledge. Step by step, a theory emerged as to how computer education would bring about change, namely by using multimedia and by emphasising conceptual thinking. In the late 1960s, debates mainly focused on so-called computer-assisted instruction (CAI) for the teaching of logic and mathematics (CERI/CT/69.04; CERI/CT/69.05). Computers were perceived as a powerful instrument for teaching because students would receive feedback immediately rather than several days later (CERI/CT/69.02). This method had been developed and tested in the United States and, similar to the analogue teaching machine in the previous decade, was promoted as a means of individualising learning (Atkinson 1969; Suppes 1969), an inherent rationale in educational technology discourse. Yet the discussions organised by the CERI shifted smoothly away from CAI and towards the systems-approach, that is the view that improvements in learning can be reached by creating a stimulating, technologized, learning environment, aimed at preparing students for the technologized future. In other words, discussions were centred less around tools and instead focused on the changes that technology could bring. Technology was meant to reform classroom interaction, and the classroom was a space with many components. In line with the contemporary shift to include the environment in the concept of learning (Hof and Müggenburg 2021), the

systems-approach became the core episteme of the CERI's computer education approach. The term 'systems' meant an 'organised set of the elements with which pupils are in contact' (CERI/CT/69.03, 18). Emphasis was placed on interaction within a learning environment. The ideal environment included not only computers, software and algorithm games, but also television sequences, films, language laboratories, teaching machines, books and programmed books, in addition to the teacher and the students (CERI/CT/69.03; CERI/CT/70.03; CERI/CT/70.46; CERI/CD/M(71)).

The prioritisation and relevance of computer education to curriculum development is visible in the first conference, organised by the CT working group in 1970. Here, a concept of technology uses was promoted which mirrors the systems approach. In addition, conceptual thinking was stressed, reflecting the contemporary trends of 'new maths'; a reform that was advocated to improve students' mathematical skills, aimed at promoting reasoning relating to arithmetic and developing a comprehension of symbolic logic (Capel 1991; Rohstock 2014). An important distinction was made between the use of computers as instruments in the teaching process on the one hand, and the provision of courses to familiarise students with computing concepts and techniques on the other (CERI/GB(68)10). The formative value of learning how to work with a computer would cultivate 'strongly operational, algorithmically and organizational thinking' (CERI/CT/70.08). The CT working group emphasised that the 'computer should be introduced as a component of a system' and that 'algorithmic concepts' are fundamental to computer education (CERI/CT/71.01, 180). It was argued that students need to gain an understanding of the functioning of computers instead of receiving a simple training, assuming that society and technology were progressing and constantly changing. In line with the aforementioned argument, it was felt that since computers affect modern life, it was necessary for a large school population to learn how the computer works. Educational technology was perceived as an integral element of curriculum development, aimed at preparing students for modern society, of which the computer was to become an ever more integral part. Supporters of this position criticised the fact that 'continued in their present pattern of fragmented unrelation, our school curricula will ensure a citizenry unable to understand the cybernated world in which they live' (CERI/CT/70.05). Computer uses were justified by the social rationale, namely that technology helps children adapt to their environment. Children would need computer awareness to cope with a progressing society.

In 1971, an important change occurred on a bureaucratic level, when the CERI's governing board proposed the establishment of a network of correspondents with a considerable influence in their respective countries (CERI/CD/M(71)2). This illustrates the fact that policy implementation at national level was now intended to influence the content of curricula. The CERI supported research into computer use, carried out by two distinct groups: one was to present proposals regarding curricula development and one was focused on teacher training. While the first group examined the use of programming languages and simulation games and tried to understand how the content of computer science courses could be arranged, the second group outlined how teachers should be better trained. Considered together, these subgroups intended to 'produce a series of recommendations to guide the national authorities in preparing their decisions on computer sciences in secondary education' (CERI/CT/71.01, 182).

In addition, knowledge production became more formalised. In the first three years, the CERI's working group on CT organised workshops to discuss existing trends, to support the idea of multimedia uses and to encourage conceptual thinking in order to prepare students for their technologized surroundings. After 1972, the CERI's activity was aimed at establishing guidelines for the curriculum, promoting programming, reforming teacher training and producing teaching materials and equipment. The CERI now published conference presentations in hardcopy books, in order to reach out to a wider audience. The research centre supported practical experiments and provided assistance in the adaptation of teaching material from other member countries (CERI 1971a, 1971b, 1973). In addition, the CERI encouraged the founding of two specialised research centres: one institute, financed by Belgium and six other OECD member countries, was established in Louvain and set up to document and disseminate knowledge on computer uses in higher education. The institute

in Edinburgh, in turn, targeted research in secondary education (RAC/CERI, Unpublished Report No. 2537; Papadopoulos 1990, 101). The CERI first offered a 'forum of support' and a 'catalyst' to build a link between research communities and stimulate international cooperation (Papadopoulos 1990, 102). After a few years, the CERI's position as an actor became stronger – it gradually changed from the role of a moderator to an agenda setter. Nevertheless, the network of international experts did not grow any further. The exchange and creation of knowledge in the arena ended despite extensive collaboration and activity. Why was the arena dismantled?

The disbanding of the arena

Evidence that the OECD's strength relies especially on structural interdependency, i.e. the existential interlocking of national and international bureaucracy (Bürgi 2017a, 2017b, 2019) suggests that this strength has not helped in the case of computer education. Indeed, as will be argued in this section, the arena collapsed like a house of cards once national and international support vanished. Two major factors can be identified regarding the unmaking of the arena: critical voices within the CT working group as well as the economic crisis that reached a peak in 1973. The latter had an effect on the national and international support of educational technology.

The former becomes visible in the documents of the working group. Although the CERI had intended to transfer the knowledge generated in the arena to schools, and future action was discussed (CERI/D/73.01; CERI/CD/M(73)2), the CT working group stated that experts did not believe that this was the optimum time for recommending the introduction of computers in the classroom. Not only was there a lack of computers, but also a lack of convincing multimedia didactics. Secondly, the aim was to promote conceptual thinking through the medium of the computer, but steps towards the implementation of this approach were not formulated. Apart from mathematics drills, only simulation exercises had proven successful. The experts believed instead that the widespread use of computers was only to be expected in five to ten years, and in the meantime, efforts should be concentrated on large-scale experimentation and on the development of teacher training, based on material which would help teachers grasp the potential of the computer for their individual subjects (Série CERI 2/2, February 1973 and June 1973). This legitimation to continue research and, in particular, the critical evaluation of the state-of-the-art is remarkable. The discussants, invited to consider the role of technology, saw the possibilities of computer education as limited and they were sceptical about the use of computers. As of 1969, members of the CT working group noted that it was 'too early to define a technical, pedagogical and policy approach to the problem of computer use in education' (CERI/CT/69.07; see also Papadopoulos 1990, 103).

Some years later, despite the introduction of computers in secondary education and the steady increase in their number, it became clear that the strategy to promote computer education on a large scale was a distant goal. No educational market had been created and many computer programmes were still limited to teaching mathematics, science or computer science. The number of computers available for instruction per student was low, the devices were mainly used for administrative tasks and despite the promotion of systems-approaches and conceptual thinking, neither a new learning environment was created, nor a specific curriculum reform was implemented. This only changed in the 1980s with the advent of the microcomputer and initiatives from the private sector to keep the cost of school computers low (Bukoski and Korotkin 1976, 13–14; CERI 1989, 11; Price 1989, 151; Saettler 1990, 306–307). In 1974, the CERI's governing board decided that the programme on technologies for learning needed to be reformulated (CERI/CD/M(74)1, 14; CERI/CD/M(74)2, 12). Soon thereafter, it was decided to drop the whole project, since the CERI faced budgetary restrictions that led to adjustments of its programme (CERI/CD/M(75)1, 56).

A second reason as to why the CT working group discontinued its activities is the fact that the economic crisis of 1973 hit the arena heavily and, as a result, priorities changed. The crisis drastically curbed the support of national and international bureaucracies. In 1976, due to rigid austerity measures, the OECD member states withdrew their financial support for the specialised research

centre in Edinburgh (Papadopoulos 1990, 103). This represented an international trend, since two German research centres for educational technology were also closed in 1976 and 1983 when funding first declined and then ceased (Hof 2018). However, the CERI's cutbacks were not limited to measures relating to educational technology – contributions to the OECD decreased in general (Rinne, Kallo, and Hokka 2004). This implied a process of rationalisation and hence a reorganisation of activities. As a result, in 1974, the bodies dealing with educational issues that were initially located within the Directorate for Scientific Affairs were subsumed under the Manpower and Social Affairs Directorate, leading to the establishment of a new Directorate called Social Affairs, Manpower and Education (Centeno 2017, 101). This reorganisation enhanced the trend (which was launched with the establishment of the CERI) of sociologists setting the educational agenda of the organisation (Bürgi 2016). Their interest in educational technology was limited, as it had only become part of the CERI's agenda due to the intervention of CSTP. From the mid-1970s onwards, the CERI strongly emphasised the impact of education on social policy, such as the social and labour structure. As a result, the learning sciences became a new field of study within the scope of the CERI. In addition, projects on equality of educational opportunity and in particular, recurrent education were stressed (Centeno 2017, 101; Papadopoulos 1990, 104; Rinne, Kallo, and Hokka 2004). The decision-making processes regarding computer education illustrate the fact that the concepts and ideas, promoted by the CERI can suddenly – in the absence of national and international support – disappear from the agenda without attracting much attention. Other promising issues may take their place. In the mid-1970s, the too-slow adoption of the computer as a new gadget in the classroom, the erosion of funding for research at national and international level and the realignment of interests within the CERI brought the intended process of policy-making to a halt.

Conclusion

The promotion of computer education by the CERI around 1970, offers an unusual historical endorsement for attempted intervention in policy-making that ended before widespread implementation and dissemination had even taken place. As computers were becoming more user-friendly and high hopes were pinned on technology as a means of preparing students for life, computer education was seen as a key element in school reform. In other words, computers were envisioned as a solution to social problems and as agents to bring about change. In this context, the computer literacy of the average student became a major issue in curriculum development.

This article has identified that the OECD elected to deal with educational technology on account of its predominant styles of reasoning, namely, that the world was increasingly beginning to revolve around the use of technology. Four rationales (pedagogical, social, vocational and transformational) shaped the CERI's engagement with computer education. However, using the CERI as a 'vantage point' also elucidated a fifth rationale: technology as an amplifier of educational expansion and a remedy to meet the challenges resulting from the high demand for education. The computer was portrayed as a tool for providing more students with more education, thus facilitating expansion in order to generate more human capital. By the end of the 1960s, the challenges of educational growth were becoming more visible and educational technology was promoted to manage these developments.

In this context, the CT working group was set up and developed into a moderated arena in which debates took place to develop knowledge and generate proposals to improve computer education. As a moderator, the CERI initially legitimised its activities in relation to what was happening in the OECD member states. However, the CERI was soon an active agenda-setter, referring more often to the advice of experts than to the actual developments that occurred in the member states. The CT working group pursued the strategy of disseminating knowledge by consulting experts that were invited to seminars and workshops. The purpose was to draft proposals for curricula reform and to formulate recommendations to help national authorities in their decision-making. The implementation of networks, connected to national bureaucracies and the reaching out for teachers,

were ideas that were often discussed. However, at the turn of 1970, these goals remained utopias, because computers had not yet been introduced into many classrooms. As the discrepancy between the CERI's agenda and developments in member countries widened, national support for the activity faded. The CT working group was thus disbanded, knowledge gathering was discontinued and the intended policy-making failed in 1975. One reason for this was that the experts did not recommend policies, as they believed that the value of computer education had to be further studied and they realised that the implementation of school computers did not proceed as quickly as anticipated several years previously. The experts did not see the CERI's role as that of a proactive agenda-setter, speeding up implementation, but rather as a reactive supporter of national developments. Another important reason was the economic crisis, causing the member states to reduce their financial support of the OECD in general and to withdraw from several activities, including educational technology. This measure resulted in a reorganisation of the educational bodies, accompanied by a conceptual shift as sociologists were taking the lead in the agenda-setting of the CERI. To summarise, the debates organised and conducted by the CT working group shed a new light on the inner workings of the OECD as an international governmental organisation, by illustrating that the associated expert networks played a major role in the setting, definition and pursuit of research agendas. Moreover, the discontinuation of the CT working group points to conditions of success for multi-layered governing: although measures to promote computer education were intended, these were not visibly realised on a large scale. The interlocking of national and international bureaucracies – the key mechanism of the OECD's success – was not strong enough, which contributed to the fact that in the 1970s, no policy on computer education was developed within the OECD framework to be implemented by the member states. Against the background that actual computer use was still limited, neither the development nor the implementation of such a policy seemed urgent.

Note

1. The four key areas were: educational growth and educational opportunity; innovation in higher education; curriculum development and educational technology; innovation policies and structures.

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